"2007 Copper Mountain Conference on Multigrid Methods"

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Summary

The multi-year project supports annual conferences of the Copper Mountain Conference Series, held in March or early April each year at Copper Mountain, Colorado. The subject of these meetings alternates between Multigrid Methods in odd-numbered years and Iterative Methods in even-numbered years. The Copper Mountain Conference Series, which began in 1983, represents an important forum for the exchange of ideas in these two closely related fields. The DOE Office of Science Advanced Scientific Computing Research Applied Mathematics Program has supported this conference series for a decade, and current support runs through 2010. This report describes the activities in FY 2007.

From March 18 through March 23 of 2007, the thirteenth Copper Mountain Conference on Multigrid Methods was held at the Conference Center at Copper Mountain, Colorado. The conference comprised a tutorial day, five days of contributed talks, an evening "Circus" of research-in-progress, a student paper competition, and a conference Banquet. Some 55 talks were given on a wide range of topics relating to the development of multigrid methods or their application to crucial topics of today.

The conference was organized by an organizing committee co-chaired by Van Emden Henson, the PI on the DOE supporting grant, and Joel Dendy (retired from Los Alamos National Laboratory) and comprising 19 of the leading practitioners of multigrid and its applications. The committee represents 10 universities in the United States, Germany, Holland, and Israel, 3 DOE National Laboratories, and 2 major industrial companies.

The conference opened on Sunday, March 18, with the now-traditional Tutorial Day, including three separate tutorials: Multigrid, Multigrid II, and Cache-Aware Methods.

Plenary sessions commenced the next day. Three sessions were held each day, organized by topic areas. Among the emphasized topic areas were Domain Decomposition, Multigrid Applications, Multilevel Methods, Discretizations, Adaptive Algebraic Multigrid Methods and Applications, Parallel Methods, Coarsening Techniques, Computer Science and Applications, and a special session for the Student Paper Competition Winners.

All sessions were all very well attended. The Copper Mountain Conference Series is

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known for having a very relaxed atmosphere and for fostering open, active discussions. This collaborative environment has been prevalent each year since the series began in 1983, and is one of the reasons many attendees come back repeatedly.

A Student Paper Competition was held to stimulate student participation in the Conference. For the Competition, students were asked to submit a paper containing original research. Co-authorship with an advisor was permitted, provided that the student was the primary contributor and did the actual writing of the paper. A panel of judges, chaired by Professor Jim Jones of the Florida Institute of Technology and made up of members of the Program Committee, selected the winners. The winning authors, and their papers, papers were:

1. Hengguang Li, Penn State, *Uniform convergence of the multigrid V-cycle on graded meshes*
2. Christian Mense, Technische Universität Berlin, *On algebraic multi-level methods for non-symmetric systems*
3. Hisham bin Zubair, Technical University of Delft, *On Multigrid for High-Dimensional Anisotropic PDEs*

The winners of the Student Paper Competition were provided full travel support to the conference.

Another unusual feature of the Conference is the "Circus," essentially an "open-mike" forum in which any researcher in the field may describe work in progress, ask questions, propose methods or approaches, or challenge the conventional wisdom of the practitioners in the field. Because of the relatively small size of the multigrid community, this open forum is sometimes highly spirited and has been known to result in new and important collaborations.

The Copper Mountain Conference series makes a concerted effort to attract and provide support for students, women, and minorities. For example, approximately twelve percent of the talks given in the 2007 conference were given by women, a small increase in the percentage from the previous multigrid conference in 2005. Full or partial travel support was made available to several students on a "need" basis.

A "virtual proceedings" of the conference is available at www.mgnet.org, and a fully-refereed Special Issue of the journal *Numerical Linear Algebra and Applications,* dedicated to papers associated with this conference, is currently in publication.

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